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Scientists Testing New Heart Pacer

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Johns Hopkins' physicists and physicians are developing a rechargeable (from outside the body) implantable heart pacer.

The device, first conceived in December, 1965, by Robert E. Fischell, has successfully passed tests on dogs and is being readied for first clinical trials soon, its developers will report today to a meeting of the American Heart Association, in Dallas.

Fischell, a physicist who directs the Space Electric Power Systems Group at the Johns Hopkins Applied Physics Laboratory, conceived the idea of a recharageable spacecraft-type nickel-cadmium battery to power an implantable pacemaker. Once a week, for a hour or two, the heart patient would don a special vest in which an alternating magnetic field is created.

The magentic field generated by a small coil in the vest painlessly passes through the skin and other body tissues and is picked up by the implanted battery of the pacemaker, thereby recharging it. All this is done without sensation to the patient.

Present heart pacers have been invaluable in improving the health of persons having slow or irregular heartbeats. Such implanted pacers, however, have the disadvantage of having to be surgically replaced every two years of the patient's life because of energy depletion of the storage battery.

To increase battery life, present units use five to six fairly large mercury cells that increase the bulk of the pacemaker. The Hopkins team is aiming for a pacemaker that will last 20 years or longer in the human. body.

The problem of reliably powering remote electronic devices with minimum weight and size has been intensively studied for spacecraft applications. Virtually all satellites employ rechargeable nickel-cadmium cells to power electronic systems during dark portions of their orbits. This led to the Hopkins' development of its miniaturized version.

Their result is a pacemaker that is only one-half inch thick, one cubic inch in volume and weighs a mere two ounces. This is roughly one-fifth the size and weight of the range of so-called conventional pacemaker implants.

The longest of the newer implants was installed in a dog about 10 months ago, according to the principal investigators.

Dr. Kenneth B. Lewis, assistant professor of medicine, Johns Hopkins Medical School, a coauthor of the reporting, said he has been evaluating a first model of this device in laboratory tests for nearly a year. Work is continuing on the project—in particular the development of a nickel-cadmium cell that performs most efficiently at human body temperature. He estimated that before the end of 1970, sufficient testing should be completed to warrant clinical evaluation with a human patient.

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Cross References